

Remarks

The Examiner's reconsideration of the claims in view of the Applicants' amendments and arguments in response to the prior Office Action and withdrawal of rejections under 35 USC 103 is gratefully acknowledged.

In the Office Action, claims 1, 3-21, and 24-27 are pending; claims 8-19, 26 and 27 are withdrawn from consideration; and claims 1, 3-7, 20, 21, 24 and 25 stand rejected. The claims are not amended as a part of the instant response; however, an updated claim listing is provided. The Examiner is requested to reconsider the pending claims in view of the discussion below and to find the rejected claims allowable.

Claims 1, 3, 4, 6, 7, 20, 21, 24, and 25 are rejected under 35 U.S.C. 103(a) as unpatentable over Nohmi et al. (U.S. Patent No. 4,822,489, hereinafter '489) in view of Nohmi et al. (U.S. Patent No. 4,399,035, hereinafter '035). This basis for rejection is respectfully traversed for the reasons discussed below.

It is noted that the equation of the structure of the product of the instant application in comparison of the structures of the Nohmi references '035 and '489 is incorrect. Accordingly, in view of this misperception, no prima facie case of obviousness has been made.

Thus, neither reference nor their combination discloses all the features required by the instant claim 1. Claim 1 is directed to an **asymmetric** hollow fiber membrane having a **four** layer structure. As described and acknowledged by the Examiner, both references teach membranes having a **five** layer structure unlike the instant claims. Moreover, the membranes of the Nohmi references are **symmetric**, i.e., the outer and inner void layer adjacent to the central intermediate layer and the outer and inner surface layers, respectively, have similar dimensions and pore structures. In particular, both references emphasize the fact that both the surface layers have the same pore size. In contrast to that, the membrane of the instant application has an asymmetric structure comprising a first inner separation layer having the smallest pore size, a second layer having a sponge structure, a third layer having a finger structure, and an outer layer having a sponge structure with a surface having pores with a defined size and density. The size

of the pores in the outer layer is much larger than the size of the pores in the separation layer. The Nohmi references both teach membranes having separation layers with identical properties on the inside and on the outside of the membrane. Nohmi '489 discloses ultrafiltration membranes having pore sizes smaller than 0.01 micron in the selective layers, Nohmi '035 discloses microporous membranes having pore sizes of from 0.05 to 1 micron in the selective layers. The membrane of the present application only comprises one selective layer on the inside. Unlike the outer layer of the membranes taught by the Nohmi references, the outer layer of the membrane of the present application does not control the separation characteristics of the membrane or its hydraulic permeability. The properties of the outer surface of the fiber of the present application are important for the processing characteristics of the fiber rather than for the separation characteristics of an individual fiber. See page 4, line 25, through page 5, line 15 of the description (page 2, paragraphs [0021] to [0024], of the published application US 2006-0234582 A1).

In the rejection, it is stated that Nohmi '489 teaches the same materials as Applicant's specification and therefore the properties are presumed to be inherent or obvious over Nohmi '489. As described above, the written description of the claims of the instant application and the written descriptions of Nohmi '489 and Nohmi '035 describe clearly different membranes; thus, there is no basis for a presumption that the properties be inherent or obvious over the Nohmi references. Further, the enablement section of the instant application provides a process for preparing the membrane of the instant application which differs from the description for the preparation of the membranes of the Nohmi references.

There is no showing of any motivation to induce one of ordinary skill in the art to begin with either of the Nohmi references, change the number of layers (five to four), as well as the sequence of the layers (separation layer/void layer/sponge layer/void layer/separation layer to separation layer/sponge layer/void layer/sponge layer), and to move from two identical separation layers on the outside and the inside towards to different skin layers. In particular, the Nohmi references teach away from reducing the pore number in the outer layer. For instance, Nohmi '035 (column 12, lines 64-65) teaches that "the greater the number of pores, the higher the permeability and the permeation selectivity." Accordingly, there would be no motivation to

select pore numbers in the range of 10,000 to 150,000 per mm^2 as required by present claim 1, as opposed to 100,000 to 100,000,000 per mm^2 as taught by Nohmi '035.

As to claim 3, the same argument that the combination of Nohmi '489 and Nohmi '035 teaches the same materials and structure as Applicant's specification and therefore the properties are presumed to be inherent or obvious over Nohmi '489 was applied. As noted above, and for the reasons delineated above, the structures are not the same and the presumption is invalid. Again, the instant invention is not one of optimizing the pore size and density, but the invention of a qualitatively different product.

As to claim 4, the bases of the rejection do not provide an argument for obviousness in view of the major differences in the structure of the product of the instant application compared to the membrane described in Nohmi '489 as elaborated above.

As to claim 6, the bases of the rejection do not provide an argument for obviousness in view of the differences in the structure of the product of the instant application and the membrane described in Nohmi '489 elaborated above. The fact that a polysulfone polymer is used does not change the basic difference in the structural characteristics of the membrane.

As to claim 7, the bases of the rejection do not provide an argument for obviousness in view of the differences in the structure of the membrane of the instant application and the product described in Nohmi '489 and the differences in their preparation elaborated above.

As to claims 20 and 21, because they are directed to configurations of the unique membrane of claim 1, the subject matter is distinguished from the prior art.

As to claims 24 and 25, which are drawn to the membrane of claim 1 with specific densities of pores for the outer surface, the subject matter is not obvious for the reasons discussed above.

In view of the above remarks, the Examiner is requested to remove the rejection of claims 1, 3, 4, 6, 7, 20, 21, 24, and 25 under 35 U.S.C. 103(a).

Claim 5 is rejected under 35 U.S.C. 103(a) as unpatentable over Nohmi et al. (U.S. Patent No. 4,822,489) in view of Nohmi et al. (U.S. Patent No. 4,399,035) and in further

view of Buck et al. (U.S. Patent No. 4,935,141, hereinafter Buck '141). This basis for rejection is respectfully traversed for the reasons discussed below.

In the rejection, it is stated that Nohmi '489 and Nohmi '035, teach the amount of glycol, or hydrophilic polymer added is in the range of 0.5 to 30% by weight of the spinning solution but differs and does not teach the composition of the membrane; and that Nohmi '489 teaches that a high amount of glycol, over 30%, produces an unstable spinning solution and produces a membrane that can not be put to practical use. (col. 11. lines 1-18).

In the rejection, it is stated that Buck '141 discloses an asymmetric three layer membrane with a specific description, and noted that the membrane is prepared in one embodiment (at column 2, lines 26-32) from a polymer mixture including the hydrophobic and hydrophilic polymers in amounts such that the fraction of hydrophobic polymer is between about 85 and 95% thereof and the fraction of hydrophilic polymer is between about 5 and 15% thereof.

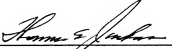
It is then stated: "It would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the composition of hydrophobic and hydrophilic polymer motivated to produce a hollow fiber membrane which has water permeability yet has high burst strength."

It is submitted that the statements of the Office Action fail to provide a prima facie case of obviousness because the facts stated in the references have been misperceived or misapplied.

As discussed above, the Nohmi references disclose symmetric five layer membranes. Moreover, the discussion in Nohmi '489 is related to the concentration of the glycol in the spinning solution and is out of context with respect to the instant claim. Note in the following paragraph of Nohmi '489 (col. 11, lines 12-14) the statement: "The concentration of the polymer in the spinning solution is in the range of 15 to 35% by weight based on the total weight of the spinning solution,..." These statements from Nohmi '489 in context provide no basis to lead one to for the instant invention, in which the process and the product are different from the cited art, as discussed above. There is no explanation of what modifications from which art would be suggested by which reference to arrive at the claimed subject matter. Accordingly, , the Examiner is requested to remove the rejection of claim 5 under 35 U.S.C. 103(a).

It is believed that the present application is now in condition for substantive examination leading to allowance and issuance. Should it help to expedite the prosecution of the application, the Examiner is encouraged to telephone the undersigned.

Respectfully submitted,
BARNES & THORNBURG LLP



Thomas E. Jackson
Attorney Reg. No. 33,064
Attorney for Applicant

Indianapolis, Indiana 46204
317-231-6477